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1995 GORDON RESEARCH CONFERENCE
ORIGINS OF SOLAR SYSTEMS

NASA Grant NAGW-4534
Final Report

The 1995 Gordon Conference on *Origins of Solar Systems* was held at the New Hampton School, New Hampton, New Hampshire, between June 18 and June 23, 1995. The conference, which brings astronomers and planetary scientists together to discuss interdisciplinary problems concerning star formation and the origin and evolution of planetary systems, was attended by 116 scientists, fairly evenly divided between the two disciplines. A list of attendees is attached. Of these, 21 were graduate students and 22 post-doctoral fellows. There were 18 foreign participants. We were very satisfied with the 39% participation rate for junior scientists, particularly in terms of encouraging new generations of researchers in this field. Many of these first-time conferees commented on how important the Conference was for them since it provided one of the few forums, perhaps the only forum, where they could learn about progress in fields of research that are generally quite disjoint.

A Special Fund from Gordon Research Conferences was almost completely used to fund the conference fees and some travel expenses for Speakers and Discussion Leaders. NASA Grant NAGW-2584 enabled conference fee funding for many others who would not otherwise have been able to attend. In total, about 46% of participants received some form of financial assistance. Approximately 48% of these were students or post-docs.

The Conference Program is appended. It encompassed a wide range of subjects bearing on solar system origins. The interest of the conferees was certainly engaged, and discussions were extensive and often very lively. Interdisciplinary research was clearly stimulated.

There were two poster sessions, one during the first half of the conference week and the other during the second. In all, slightly more than 70 posters were displayed. Two accompanied by videos proved very popular. A list of titles which attests to the range of topics covered is attached. It was gratifying that numerous speakers made the effort to incorporate poster results into their presentations,

thereby highlighting some of the very recent work of students and post-docs.

In the Business Meeting, there was a strong sentiment that this Conference played a central role in ensuring the vitality of research on origins of solar systems. For the next Gordon Conference (1997), Alan Boss, Carnegie Institution of Washington, was elected as Vice-Chair. John Kerridge, University of California at San Diego, the current Vice-Chair, will of course be Chair.

**Gordon Research Conference
June 19-23, 1995**

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Gordon Research Conference on the Origins of Solar Systems

June 19 - 23, 1995

New Hampton School, New Hampton, NH

Chair:

A. I. Sargent

Department of Astronomy, Caltech 105-24, Pasadena, CA 91125

Vice-Chair:

J. F. Kerridge

Department of Chemistry, 0317, University of California San Diego, La Jolla, CA 92093

PROGRAM

Session 1. Formation of Preplanetary Disks

Discussion leader:

E. H. Levy

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|-----|-------------------|------------------------------------|
| (1) | A. Sargent | Opening remarks |
| (2) | A. Goodman | Molecular Cloud Collapse |
| (3) | A. Boss | Formation of the Protosolar Nebula |

Session 2. Preplanetary Disks

Discussion Leader:

C. J. Lada

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| (1) | D. N. C. Lin | Disk Kinematics |
| (2) | M. McCaughrean | Protoplanetary Disks in Young Stellar Clusters |

Session 3. Nucleosynthesis and Chemical Evolution

Discussion Leader:

D. D. Clayton

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|-----|-------------------------|---|
| (1) | A. G. W. Cameron | Massive Supernovae, Orion Gamma-Rays, and the Formation of the Solar System |
| (2) | T. J. Millar | Chemistry on Small Scales within Star-Forming Regions |
| (3) | M. Busso | Nucleosynthetic Implications of Meteoritic Isotope Anomalies |

Session 4. Interstellar dust in the Solar System

Discussion leader:

D. S. Woolum

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| (1) | D. E. Brownlee | Dust Properties |
| (2) | U. Ott | Sources of the Dust |

Session 5. **Dust in Specific Environments**

Discussion leader: **S. P. Ruden**

- (1) **J. N. Cuzzi** *Dust in the Nebular Environment*
- (2) **S. V. W. Beckwith** *Dust In Protoplanetary Disks*
- (3) **B. Zuckerman** *Dust and Gas in Vega-type Disks*

Session 6. **Effects of Secondary Objects**

Discussion leader: **C. Porco**

- (1) **A. M. Ghez** *The Effect of Binaries*
- (2) **P. D. Nicholson** *Planetary Rings*

Session 7. **Dissipating the Disks - Chronology**

Discussion leader: **J. J. Lissauer**

- (1) **P. Cassen** *Chronology (Theory)*
- (2) *Business meeting*
- (3) **S. E. Strom** *Chronology (Astronomical Observations)*

Session 8. **Dissipating the Disks - continued**

Discussion leader: **J. A. Wood**

- (1) **G. W. Lugmair** *Radiochronological Constraints on Planetesimal Formation*
- (2) **G. Wetherill** *Theoretical Modelling of the Growth of Planetesimals*

Session 9. **Primitive Objects in the Outer Solar System**

Discussion leader: **M. J. Mumma**

- (1) **S. J. Weidenschilling** *Accretion of Comets*
- (2) **J. X. Luu** *Objects in the Kuiper Belt*
- (3) **C. R. Chapman** *Results from Comet Shoemaker/Levy*

Gordon Research Conference on the Origins of Solar Systems

June 19 - 23, 1995

New Hampton School, New Hampton, NH

POSTERS

SESSION A

Monday, June 19 - Noon, Wednesday, June 21

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| A1 - Nancy Adams | <i>The Usual Case of the Naked T Tauri Twins: Rotational Modulation and Photometry of NTTS 0537+0231</i> |
| A2 - Robbins Bell | <i>Disk Shape: Do Disks Really Flare with Radius?</i> |
| A3 - " | <i>Timescales and Thermal Structure Illuminated Disks</i> |
| A4 - William Cabot | <i>Numerical Simulation Results of Protoplanetary Disk Convection</i> |
| A5 - Nuria Calvet | <i>Do we Know the Masses of T Tauri Disks?</i> |
| A6 - Steven Charnley | <i>Hot Molecular Cores</i> |
| A7 - " | <i>The Chemical Signature of Ambipolar Diffusion in Dark Clouds</i> |
| A8 - Kenneth Chick | <i>Nonlinear Radiative Heat Transfer in Protostellar Envelope</i> |
| A9 - Glenn Ciolek | <i>Ambipolar Diffusion, Interstellar Dust, Ultraviolet Radiation, and the Formation of Stars</i> |
| A10 - Simon Clemett | <i>Molecular and Isotopic Measurements of Organic Molecules in Interplanetary Dust Particles and Interstellar Graphite Grains</i> |
| A11 - Charles Curry | <i>Global Instabilities in Magnetized Accretion Disks</i> |
| A12 - Prudence Foster | <i>Distinguishing between Cloud Collapse and Destruction in Shock-Cloud Interactions</i> |
| A13 - Charles Gammie | <i>Layered Accretion in T Tauri Disks</i> |
| A14 - Carol Grady | <i>Accreting Gas in the Disks of Herbig Ae/Be Stars: the UV Survey and Comparison with Classical T Tauri Stars</i> |
| A15 - Tom Hayward | <i>SpecroCam-10 Observations of Circumstellar Disks in Orion and Taurus</i> |
| A16 - Michiel Hogerheijde | <i>HCO⁺ and CO Observations of YSO's in Taurus: Confrontation with Models</i> |
| A17 - Gary Huss | <i>Presolar Grains as Probes of Stellar Nucleosynthesis</i> |
| A18 - Liping Jin | <i>26Al Production by Cosmic Ray Bombardment on the Surface of the Solar Nebula</i> |
| A19 - David Koerner | <i>Kinematic Modeling of Circumstellar Disks</i> |
| A20 - Michael Meyer | <i>Evolution of Circumstellar Disks in Deeply Embedded Clusters: a Function of Stellar Mass?</i> |
| A21 - Taishi Nakamoto | <i>Growth of Protoplanetary Disks around Protostars</i> |
| A22 - Gopal Narayanan | <i>Evidence for Multiple Outbursts from the Cepheus A Molecular Outflow</i> |
| A23 - Antonella Natta | <i>Infall Phenomena in Herbig Ae/Be Stars</i> |
| A24 - Andrew Nelson | <i>Spiral Instabilities and Clumping in Protostellar Accretion Disks</i> |
| A25 - Mauricio Reyes-Ruiz | <i>Winds and the Accretion Disk Model for Protoplanetary Nebulae</i> |
| A26 - David Schleicher | <i>Comet Taxonomy and Evolution</i> |
| A27 - Debra Shepherd | <i>Bipolar Outflows in Massive Star Forming Regions</i> |
| A28 - Celeste Spangler | <i>DM Tauri - Rotation are Infall?</i> |
| A29 - Steven Stahler | |
| A30 - Karl Stapelfeldt | <i>WFPC2 Observations of the HH 30 Disk and Jet</i> |
| A31 - Alan Tokunaga | <i>Adaptive Optics Observations of Circumstellar Material around T Tauri Stars</i> |
| A32 - Frederick Walter | <i>Gaseous Circumstellar Disks as Seen in the Molecular Hydrogen Lyman Bands</i> |
| A33 - Mark Wardle | <i>Stratification in Dusty, Magnetized Protostellar Disks and the Origin of Bipolar Flows</i> |
| A34 - Guenther Wuchterl | <i>Convective Protostellar Collapse towards Deuterium Burning</i> |

VCR Poster

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| A35 - Rachid Ouyed
& Ralph Pudritz | <i>Outflows from Accretion Disks</i> |
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SESSION B

Noon, Wednesday, June 21 - Friday, June 23

- B1 - Dana Backman Kuiper Belt Collision Debris and "Vega/beta Pic" Disks
B2 - Harold Butner The Mid-Infrared Spectra of Young Objects and Vega-like Stars
B3 - John Carr Dynamical Clearing of Disks in PMS Binaries: Search for Gaseous Material in Optically Thin Disks
B4 - Anita Cochran The Detection of Faint Kuiper Belt Comets Using HST Observations
B5 - William Cochran A High-Precision Radial-Velocity Search for Other Solar Systems
B6 - Armand Delsemme Have All the Terrestrial Volatiles been Provided by an Early Cometary Bombardment?
B7 - Marina Fomenkova Chemical Evolution of Interstellar Dust into Planetary Materials
B8 - Eric Gaidos Complete Proper-Motion Identification of Candidates for Main Sequence and Pre-Main-Sequence Stars with Significant IRAS Flux Excesses
B9 - Joseph Hahn Jeans Instability in Comet Shoemaker-Levy 9
B10 - Paul Harvey Far-IR Observations of Main Sequence Stars with Dust Shells
B11 - Eric Jensen Disk Disruption by Young Binary Systems
B12 - Charles KenKnight Multi-Component Convection Caused Chondrules
B13 - Jacek Leliwa-Kopystyński Icy Satellites: from Accretion to Present Days
B14 - Jack Lissauer Direct Census of Kuiper Belt and Oort Cloud
B15 - Robert Malcuit Retrograde Planetoid Capture for Venus and Implications for the Tectonic History of the Planet
B16 - Vincent Mannings Searching for Protoplanetary Disks around Intermediate-Mass Pre-MS Stars
B17 - Leonid Marochnik Formation of the Massive Oort Cloud and its Back Reaction on Initial Positions of Outer Planets
B18 - Geoff Marcy The Status of Doppler Searches for Planets
B19 - Ralph Neuhaeuser X-ray Selected Weak-Line T Tauri Stars South of Taurus
B20 - Brian Pickett
B21 - Lisa Prato Both Stars in TT Binaries ARE TTs
B22 - Terrence Rettig
B23 - Derek Richardson A Self-Consistent Numerical Treatment of Fractal Aggregate Dynamics
B24 - Tamara Ruzmaikina Chondrule Formation in the Cooling Shocks
B25 - " Restrictions on the Solar Nebula from the Kuiper Belt Mass Deficit
B26 - Michal Simon Lunar Occultation Observations of the T Tauri Binary
B27 - " Disk Dissipation in Single and Binary Young Star Systems in Taurus
B28 - Michael Sitko Dust in Herbig Ae/Be Stars - What It Can Tell Us
B29 - Karl Stapelfeldt A Search for Gaseous Circumstellar Disks via H₂ Absorption
B30 - " Circumstellar Molecular Gas of PV Cephei
B31 - Tomasz Stepinski Global Evolution of Solids in Viscous Protoplanetary Disks
B32 - Kimberley Supulver Particle Coagulation in Planetesimal Formation
B33 - Scott Wolk Investigating "Origins" with Small Telescopes: Rotation Periods Observed from Long Island
B34 - Guenther Wuchterl Giant Planet Formation - Hydrostatic vs. Hydrodynamic Models

VCR Poster

- B35 - John Chambers The Dynamics of Systems of Planetary Embryos